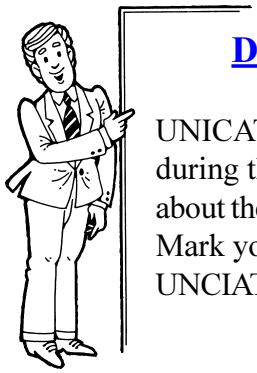
UNICAT Newsbriefs
Issue 30
November, 1999



Dedication Ceremony Announced

UNICAT Sector 33 will be officially dedicated during ceremonies during the APS Users Meeting on May 2, 2000. More information about the activities will be forthcoming in future issues of *Newsbriefs*. Mark your calendars and plan to attend this important occasion for UNCIAT.

From the Desk of Haydn Chen, Director

A major milestone has been reached for our quest for the development of state-of –the-art beamlines and experimental facilities at the Advanced Photon Source. As of November 1, 1999, UNICAT has declared a full operation status for Sector 33-ID with the commencement of Independent Investigator program starting a year late on November 1, 2000. This monumental achievement can never be realized without the support and hard work of the UNICAT staff and a number of you who have made invaluable contributions. A dedication ceremony for the declaration of operation of sector 33-ID is planned on May 2, 2000, during the 10th APS Users Meeting at Argonne National Laboratory. Please mark your calendar for this special event.

The Syncrotron Radiation Instrumentation Conference (SRI'99) was held in SSRL, Stanford University, CA. UNICAT activities were well represented by two invited talks (by Gene Ice and Jon Tischler) plus a number of nicely prepared posters. A list of papers and their respective abbreviated abstracts presented at SRI'99 are included in this newsletter. The following UNICAT members attended the conference: G. Long and A. Allen of NIST, G. Ice, J. Tischler and K. Chung of ORNL, P. Zschack, P. Jemian, C. Benson and H. Chen of UIUC-MRL.

Continuing development of sector 33-BM and 34-ID are in progress. More detail can be found in those sections of this newsletter. The 33-BM beamline is being put together with the DCM component being the rate-limiting part, which delivery is expected in January 2000. It is our goal to bring the 33-BM beamline to the early commissioning phase in summer 2000. Radiation enclosure on sector 34-ID is shaping up with many optical components arriving steadily.

A feature article on the UNICAT project is in the works for the UIUC College of Engineering magazine *Momentum*. The publication is new and will be published several times throughout the year. The targeted readership will be University of Illinois alums and those interested in the activities of the College. You will be notified of the publish date as it becomes available.

UNICAT is scheduled for a scientific review by ANL-PEB in Feb. 2000. This is an important event to highlight your scientific activities and to meet the program evaluation criteria. Paul and I will be putting together a packet of information for this event. Your input is welcomed.

Once again, we need your attention and diligence to mail the UNICAT office your scientific output with proper acknowledgements. An appropriate acknowledgement should be included as part of any abstract for presentations at conferences as well as in any written works. While we are in the early stages of finding results from our funding sources as UNICAT but it is a good time to establish the habit of submitting to the UNICAT main office copies of the papers. When they are first submitted for publication you may send a copy of the manuscript, noting to whom it was submitted and then follow-up with an actual copy of the article when published. Required acknowledgement content can be found on our website or you can send a request for the information directly to Ramona Simpson at rlsimpso@uiuc.edu.

APS Update
(October 1999)

Beamline Allocation

- 24 sectors allocated through signing of MOUs.
- 17 CATS represented (BESSRC, Bio, CARS, CMC, COM, DND, HP, IMM, IMCA, MHATT, MR, MU, PNC, SBC, SER, SRI, UNI)
- Two Proposals approved:
  - Northeast Region CAT (NE-CAT)
  - Structural Genomics CAT (SGX-CAT)
- Two Letters of Intent approved:
  - Molecular Biology CAT (MB-CAT)
  - National Institute of General Medical Sciences/National Cancer Institute CAT (GM/CA-CAT)

APS FY1999 Operational Statistics

• Scheduled use of time:

- User Operation	5053.6 hours	57.7%
- Studies	1408.4 hours	16.1%
- Maintenance	2298.0 hours	26.2%

• DOE Support:

APS Requested	$106.6M (FY99)	$107.0M (FY00)
Actual Amount	$86.2M (FY99)	$85.969M (FY00)

• Laboratory Directed R&D

4th Generation Light Sources	$1,780K
Structural Genomics	$200K
APS Beamlines	$500K
APS Other	$120K

Top-Up Operation

Internal top-up operational readiness review was carried out May 19, 1999. Fill-on fill with shutters open began during the 5/99 run period. Radiation levels less than 3 mR/hr (near 3-ID) was detected during fill at normal rate. APS has introduced 10 minutes of 10-3 current control at the start of the morning fills. Experimenters with "fast" detectors reported that they could take data with use of inhibit trigger. Experimenters with integrating detectors, whose data was degraded by top-up, found that the 10-minute interval was not useful for problem solving. APS personnel will investigate techniques for x-ray data collection in top-up mode.

Integrated Safety Management System (ISMS) Verification

DOE review of ANL Safety Management is scheduled for 17-28 January 2000. ISMS means managing safety the way we manage anything else we do. ISMS deals with seven guiding principles: (1) Line management responsibility; (2) Clear roles and responsibilities; (3) Competence per responsibilities; (4) Balanced priorities; (5) Identification of Safety Standards; (6) Tailor hazard controls to work; and (7) Operations authorization. Overlapping with the above guiding principles are five core functions: (1) Define scope of work; (2) Analyze hazards; (3) Develop and implement controls; (4) Perform work; and (5) Feedback and improvement.

November 12, 1999 (summarized by H. Chen)

Moncton Announces APS Reorganization

As the Advanced Photon Source completes the transition to a broad operational research mission, an expanded organizational structure is required. To better integrate all APS operations activities, the accelerator, user, and site operations have been combined to form a new APS Operations Division. To better support APS user research, a new APS User Program Division is formed which will be the focus of administrative and technical support for users.

Two new senior executive management appointments were announced. They are Dr. John N. Galayda as Deputy Associate Laboratory Director and Dr. Gopal K. Shenoy as Senior Scientific Director.

In addition to these two executive-level positions, the APS Operations Division and the APS User Program Division are being formed. The APS Operations Division will coalesce all APS accelerator operations, user operations, and site operations in one unit enhancing the integration of these functions. Mr. Antanas V. Rauchas will be Acting Division Director. The APS User Program Division, which will include the APS User Administration and Support Office, the APS Optics Fabrication and Metrology Group, the Beamline Control and Data Acquisition Group, and X-ray optics research, will enhance support for continued development of APS user research. Dr. Dennis M. Mills will be Acting Division Director for this new division and manage all liaison activities with the APS user research program. Dr. Efim Gluskin will be Acting Director of the Experimental Facilities Division, and Dr. John N. Galayda will serve as Acting Director of the Accelerator Systems.

Sector 33 Update

Paul Zschack

The UNICAT ID beamline has reached the point where reliable, stable beam can be provided into the two experimental stations, 33ID-D and 33ID-E. The beam delivered is reliable and stable for energies between 8 and 30 KeV. Focusing and harmonic rejection are as planned over this range. Continuing efforts will be made to extend this range to the design specification 4-40 KeV.

The endstations are equipped to accommodate many experiments. The general-purpose station has available a Huber diffractometer, a Newport diffractometer, and a USAXS platform. Although the Newport still requires some commissioning time, the Huber is available to accommodate essentially all experiments that require a simple diffractometer. The compliment of slits, detectors, etc.. that facilitate this basic class of experiment are on hand, and a displex cryostat permits low temperature studies. We can accommodate general scattering measurements, and should be considered operational for this class of experiment.

The USAXS platform can also be considered operational. Basic USAXS measurements have been performed, and the fundamental motion control issues have been addressed. We have used the platform for USAXS as well as for channelcut pre-conditioning to the diffraction station.

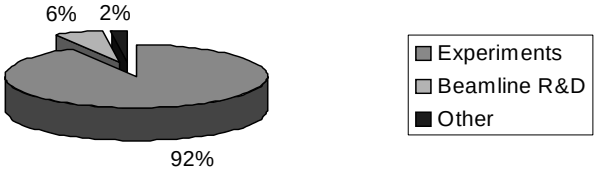
The surface diffraction chamber is also ready for measurements on clean surfaces and limited evaporated film systems. Further MBE and CVD capabilities are planned but not available at this time.

In addition to this progress and success on the ID beamline, we move forward on the Bending Magnet beamline project. A detailed timeline for the remaining installation tasks is being prepared to assure a smooth installation period. The BM mirrors have arrived at APS and are scheduled for metrology inspection in November. The DCM is scheduled for delivery to UNICAT in January 2000, and remains the time-critical component. And, there are still PSS and shielding verification requirements to be met. When it arrives, we plan to stage the DCM in the lab for testing & QA. If all goes well with that effort, I imagine that the DCM will be installed into the beamline late in the first quarter, with commissioning to follow. Optimistically, I would expect the first commissioning experiments from UNICAT members would be in the late spring or early summer.

Experiment List Update from 1 Oct. 1998 through 1 Oct .1999.

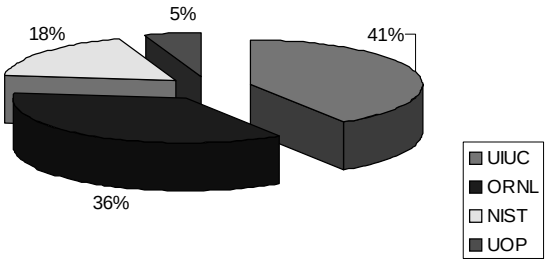
UNICAT Staff	Beamline Studies
Gabrielle Long	USAXS
Jon Tischler	Microbeam Diffraction
Steve Nagler	Magnetic X-ray Scattering
T-C. Chiang	Charge Density Waves
Myron Salamon	Magnetic X-ray Scattering
P. Zschack	Anomalous Scattering
G. Ice	Resonant Scattering
G. Long	USAXS Optics
P. Jemian	ASAXS
H. Hong	RSXD
H. Chen	Diffuse Scattering
J. Tischler	Pulsed Laser Ablation
I. Robinson	CXRD
B. Broach	Powder Diffraction

Beamline Utilization FY1999



The distribution of beamtime utilization is shown in the first pie chart above with over 90% of the beamtime utilized for experiments.

Beam Allocations FY1999



Among the 92% beamtime utilized by UNICAT members, the allocation percentages to each member institution are listed in the above pie chart.

Sector 34 Update

C. Benson and I. Robinson

Hutch construction has started on sector 34. The first optical enclosure is installed and painted, and electrical work is scheduled to begin during November. The second enclosure is under construction. A preliminary schedule for the remaining hutches follows:

34-ID-C	Fabrication drawings, done. Panels ship to APS, Nov. 29th, 1999. Installation, 6-7 weeks.
34-ID-D	Fabrication drawings, started. Panels ship to APS, Jan. 3rd, 2000. Installation, 6-7 weeks.
34-ID-E	Approval drawings, done. Panels ship to APS, Feb. 21st, 2000. Installation 6-7 weeks.

Beneficial occupancy for the last hutch should occur in late April, allowing utility hook-ups during May and installation of beamline components over the summer months.

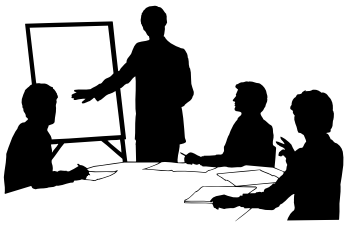
All of the parts for the beam splitting mirror are now in house. The mirror mount is assembled, but a leak has been found in the weld between the copper cold finger and the liquid nitrogen feed, so more work is needed before the entire system can be tested.

Other components are beginning to arrive. The welded frames, kinematic mounts and aluminum table tops are all on hand for the beamline tables. Oxford Instruments delivered the septum mask and two other water cooled masks over the last two months. Still under construction are the shutters and collimators, as well as the white beam transports, from Advanced Design Consulting.

Plans for the CXD diffractometer are proceding. In September, Ian and Curt met with Guy Bouvree and Alain Jarrossay from Newport to flesh out the diffractometer design. It was decided that an additional, vertical axis, rotary table could be mounted below the sample position to carry cryostats and other heavy equipment. Space constraints in the coherent scattering hutch require alterations of the standard Newport support platform. Also, the beam transport tables must be designed in cooperation with the Newport in order to avoid collisions with the diffractometer base.

XCITE Workshop News

Over sixty representatives from Illinois community colleges, liberal arts colleges, universities, and manufacturers gathered at Argonne National Laboratory for the first XCITE (X-ray Collaboration for Illinois Technology and Education) conference on July 24, 1999.



XCITE is comprised of Illinois universities leading collaborative access teams (CATs) at the Advanced Photon Source (APS) at Argonne, and includes UNICAT (UIUC), DND-CAT (Northwestern), CARS (University of Chicago, SIU, NIU), BioCAT, IMCA-CAT, and MRCAT (IIT).

Conference organizers addressed the interests of "non-users": Illinois industry representatives and educators lacking detailed familiarity with APS. In addition to an overview of APS operations and potential, topics included materials science, protein crystallography, biological, chemical, and environmental applications, condensed matter physics, and imaging.

According to David Williams, XCITE outreach coordinator, post-conference evaluations indicate that primary goals—to foment new partnerships and curricular inclusion of APS knowledge in science teaching—were achieved. Follow-up activities will include mini-conferences and seminars throughout the state, internships, and possible research collaborations.

In fact, 10-12 summer research internships are now established by XCITE for summer 2000. Undergraduate students, after completing their sophomore studies in biology, physical sciencem computer science and engineering are encouraged to apply through the Argonne National Lab, Division of Educational Programs. Moreover, a 2nd workshop is planned for April to focus educational outreach to 4-year colleges and universities in the state.

SRI '99 Conference Paper Titles and Authors from UNICAT Members

Beam Splitting Mirror for Advanced Photon Source Sector 34-ID, Curtis Benson and Ian Robinson

Elliptical X-ray Microprobe Mirrors by Differential Deposition, Gene Ice, Jin-Seok Chung, Jon Tischler, and Andrew Lunt.

The USAXS Instrument on UNICAT, Gabrielle G, Long, Andrew J. Allen, Jan Ilavsky, Pete R. Jemian, and Paul Zschack.

Design and Performance of the UNICAT Insertion Device Beamline at the Advanced Photon Source, Paul Zschack, Gene E. Ice, Jonathan Z. Tischler, Hawoong Hong, David Robinson, Pete R. Jemian, Bennett C. Larson, Haydn Chen, Gabrielle G. Long and Robert W. Broach.

The UNICAT Control System at the Advanced Photon Source, Pete R. Jemian, Jon Tischler, Paul Zschack, Hawoong Hong, and Jenia Karapetrova.

Microbeams Techniques for Stress Measurements, Gene Ice (Invited).

An X-ray Surface Diffraction Chamber for Pulsed Laser Ablation Film Growth. J. Z. Tischler, G. Eres, D. H. Lowndes, B. C. Larson, M. Yoon, Paul Zschack, T. C. Chiang. (Invited).

Newsbriefs is a periodic publication of the UNICAT group. Additional information about UNICAT and the Advanced Photon Source can be obtained through UNICAT's homepage at http://www.uni.aps.anl.gov or by contacting the UNICAT office at 217-244-4666.

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